

Evaluation of the Sports Ankle Rating System in Young, Athletic Individuals With Acute Lateral Ankle Sprains

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ABSTRACT

The purpose of this paper is to introduce the Sports Ankle Rating System and provide the initial validation for its use. As its name implies, this outcomes measurement system is intended for use in assessing the functional outcomes of athletes with ankle injuries. This unique system consists of three distinct instruments: the Quality of Life Measure, the Clinical Rating Score, and the Single Assessment Numeric Evaluation. We began the validation process of the Sports Ankle Rating System with subjects who had sustained lateral ankle sprains because this is the most common injury in sports. The results of this study indicate that the Sports Ankle Rating System is:

1. effective at assessing the impact that an ankle sprain has on an athlete's functional and psychosocial status,
2. responsive to changes in an athlete's ankle-related health status, and
3. valid and reliable as tested.

Key Words: Outcomes Assessment; Quality of Life; Ankle Injuries.

INTRODUCTION

Health outcomes measurement systems can be divided into two primary categories:

1. measures of general health status, and
2. disease-specific measures.²²

Disease-specific outcomes measures are directed at assessing the effects of an injury to a specific body region (e.g. Foot Function Index) or a specific type of illness (e.g. the Musculoskeletal Function Assessment Instrument), whereas measures of general health status (e.g. the Medical Outcomes Study Short Form – 36) assess overall health.^{5,15,22,28} Ankle-specific outcomes measures may help clinicians to more precisely define the ankle-related health status of their patients because these instruments are directed at providing meaningful information that may not be provided by clinical testing alone. Although several ankle-specific outcomes measures have been reported in the literature, there are relatively few instruments available for the ankle when compared to the number of instruments that are present for the knee and shoulder joints.^{1,4-7,12,21,22-25} Surprisingly, there are few ankle-specific outcomes measures that focus on assessing the functional outcomes of athletes.^{12,24-25} Furthermore, although many of these rating systems assess function, they do not evaluate the impact that an ankle injury has on a person's quality of life.

The paucity of valid and reliable ankle-specific outcomes measures and the limited scope of many of these instruments present a dilemma for clinicians who treat athletes. In an attempt to fill this void, we have developed the Sports Ankle Rating System. The purpose of this manuscript is to present the Sports Ankle Rating System and the results of a study that assesses its validity and reliability.

METHODS AND MATERIALS

Instruments

The Sports Ankle Rating System consists of three outcomes measures: the Quality of Life (QOL)

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Measure, the Clinical Rating Score, and the Single Assessment Numeric Evaluation (SANE). This outcomes measurement system includes both patient-based (self-administered) and process-based (clinician-administered) assessments in order to provide the clinician with a more complete evaluation of an athlete's ankle-related health status. The Sports Ankle Rating System is designed so that depending on the circumstances that a clinician is presented with, he or she may use a single instrument or administer the entire system.

The QOL Measure is a patient-based questionnaire designed to assess the impact that an ankle injury has on an athlete's quality of life. This instrument consists of five sub-scales: Symptoms, Work/School Activities, Recreation and Sports, Activities of Daily Living, and Lifestyle. Each sub-scale contains five questions designed to evaluate different aspects of the domain annotated by the sub-scale title. There are five possible responses to each question, which are organized to represent a spectrum of function and graded in a quasi-Likert style with answers to the left indicating extreme dysfunction (graded 0) and answers to the right indicating "normal" function (graded 4). Thus, the score for each sub-scale ranges from 0 to 20 with higher scores indicating better function.

The second component of the Sports Ankle Rating System is the Clinical Rating Score. This instrument assesses ankle health with an integrated approach that includes both patient and process-based methods of assessment. The patient-based part of the instrument consists of visual analog scales (VAS) for Pain, Swelling, Stiffness, Giving-Way, and Function. Each VAS is made up of an eight-centimeter line positioned between two descriptors that denote a spectrum of responses. Responses are rounded to the nearest centimeter; thus, the score on each VAS ranges from 0 to 8 and the patient-based part of the Clinical Rating Score has a range of 0 to 40 points. The objective part of the Clinical Rating Score includes clinical assessments of Gait, Motion, Strength, Stability, Postural Stability (single leg stance test), and Function (lateral hop for distance test). The grading system for this part of the instrument is formatted so that a spectrum of dysfunction is displayed using six descriptors. The descriptors that are furthest to the left describe extreme dysfunction and are graded 0, whereas those to the far right describe "normal" function and are graded 10. As a result, each item contributes up to 10 points to the total and the maximum score for the objective part of the Clinical Rating Score is 60 points. The scores for the subjective and objective parts of the Clinical Rating Score may either be kept separate to prevent mixing of these domains or combined to gain a simple score that ranges from 0 to 100.

We included the single leg stance test in the Clinical Rating Score because there appears to be an association between ankle injuries and neuromuscular function. The single leg stance test is administered by having the patient stand barefoot on one leg for as long as possible while keeping his or her eyes closed, arms at the sides, and the test knee fully extended. The duration that the patient maintains single leg stance is measured (in seconds) with a standard stopwatch. The test is terminated when the patient touches the ground with the opposite foot, hops, supports the weight-bearing leg with the opposite leg, bends the knee noticeably, attempts to provide stability with the upper extremities, or opens his or her eyes. The mean single leg stance time for the involved leg is described as a percentage of the mean single leg stance time achieved on the uninvolved leg and then converted to the Postural Stability score with the grading scale for Postural Stability within the Clinical Rating Score. If a patient is unable or unwilling to perform the single leg stance test, then a score of zero is recorded for Postural Stability.

We included the lateral hop for distance test in the Clinical Rating Score because we believe that functional testing is critical when assessing outcomes in the athletic population. This particular test was chosen because Gerber and coworkers¹¹ found that the lateral hop for distance test more effectively detects deficits in ankle function than hop tests performed in other directions. The lateral hop for distance test is administered by having a patient stand on one leg while facing a direction that is perpendicular to the test "runway". When signaled, the patient hops as far as possible in the lateral direction with three continuous hops on the same leg. The distance between the starting line and the place where the patient lands on the third hop (measured at the side of the heel in centimeters) is recorded for analysis. The average distance the athlete hops on the involved leg is described as a percentage of the distance that he or she hops on the uninvolved leg. The resulting percentage is converted to the Function score with the grading scale for Function within the Clinical Rating Score. In the event that a patient is unable or unwilling to perform the lateral hop for distance test, a score of zero is assigned for Function.

The third and final instrument in the Sports Ankle Rating System is the SANE.²⁹⁻³⁰ To complete the SANE, patients are asked to answer the following single written question: "On a scale of 0 to 100, how would you rate your ankle's function with 100 being normal?" The SANE is an efficient and straightforward method of assessing a patient's perception of the global functional status of his or her ankle that may be useful in evaluating outcomes when resources are limited and for telephonic or electronic follow-up.

Validation Study

Subjects: Thirty United States Military Academy (USMA) cadets with a mean age of 19.7 ± 1.1 years (range, 18 to 22) volunteered to participate in this study. Fifteen individuals (14 male, one female) who had sustained grade II lateral ankle sprains were enrolled into the experimental group (ankle sprain) and fifteen subjects (12 male, three female) who reported that they had "normal" ankle function bilaterally served as a reference group. An a priori power analysis based upon prospective pilot data collected with the Sports Ankle Rating System was used to determine the appropriate sample size for this study. The mean difference in QOL Measure scores for a group of subjects with grade II ankle sprains and a group of uninjured subjects was used to determine the effect size for the power analysis. The significance level (α) for the power analysis was set at 0.05 and the minimal acceptable power was set at 0.80. The results of this analysis indicated that a significant difference between groups could be detected with a sample size of 15 subjects per group while maintaining a very high level of power (>0.95).

The ankle sprain group subjects were identified by an orthopaedic surgeon performing musculoskeletal evaluations at cadet morning sick call or in the athletic training rooms following evening intramural and intercollegiate sports. A cadet was considered to be a potential ankle sprain group subject if he or she was diagnosed with a grade II lateral ankle sprain and the injury had occurred within the previous 48 hours. Ankle sprains were classified utilizing the West Point Ankle Grading System previously described by Gerber et al.¹¹ Lateral and mortise x-radiographs were obtained for all injured ankles to rule out the presence of fractures. All subjects with fractures, histories of ankle injuries within the prior 6 months, or injuries to another body region were excluded from the study. Participation in the study was strictly voluntary and all subjects signed institutionally approved volunteer agreement affidavits. This study was approved by the Keller Army Community Hospital Human Subject Research Review Board and the USMA Department of Institutional Research.

Data Collection

Subjects enrolled in the ankle sprain group received a packet of Sports Ankle Rating System forms that included two QOL Measure questionnaires, two SANE ratings, and one packet of VAS at the initial evaluation. Subjects received specific instructions on the methods for completing each of the instruments and someone was available to answer any questions that the subjects had. The first questionnaires completed by the subjects included a QOL Measure and a SANE that were used to estimate their pre-injury ankle-related health status. These

instruments were completed according to a subject's perception of his or her ankle function and associated quality of life during the week prior to the ankle injury. After finishing these questionnaires, subjects completed the second QOL Measure and SANE, as well as, the five VAS (subjective part of the Clinical Rating Score). These instruments assessed ankle function and the impact that the injuries had on the subjects' lives during the period between the injury and the initial evaluation. When the patient-based measures were completed, the objective tests of the Clinical Rating Score were administered. The same orthopaedic surgeon and physical therapist performed all testing to ensure methodological consistency. The orthopaedic surgeon assessed Motion, Strength, and Stability, whereas the physical therapist assessed Gait, Postural Stability, and Function. Each assessment was performed utilizing standard methodology. Subjects in the ankle sprain group were reexamined at two and four weeks following the initial evaluation. At these evaluations each subject completed the three patient-based components of the Sports Ankle Rating System according to his or her ankle's status during the previous week and was reevaluated by the orthopaedist and physical therapist. Radiographs were not repeated.

The cadet volunteers enrolled in the reference group were evaluated twice. The first evaluation established the subjects' baseline Sports Ankle Rating System scores. The second evaluation was performed approximately one week after the first in order to establish the test-retest reliability of the rating system. The methods used when assessing the reference group subjects were identical to those used when assessing the ankle sprain group subjects. Lateral and mortise radiographs were taken of the test ankle of each reference group subject in order to ensure that his or her ankle could be considered "normal". The reference group subjects' test ankles were randomly selected using the last digit of their Social Security Numbers (even numbers=right, odd numbers=left). Subjects in the reference group completed the outcomes measures based upon their ankle-related health status during the week prior to each of the evaluation sessions.

Statistical Analyses

Group and Interval Comparisons: We had two hypotheses related to group and interval comparisons. The first hypothesis was that the ankle sprain group's scores on each of the Sports Ankle Rating System instruments would be significantly different from the reference group's scores at each of the post-injury evaluations, but their "pre-injury" QOL Measure and SANE scores would not be. The second hypothesis was that the ankle sprain group's scores on each instrument would be significantly different across evaluation intervals (i.e. the four QOL

Table 1: Sports Ankle Rating System scores for the ankle sprain group at each evaluation interval. The mean scores are presented as mean + standard deviation (SD). Floor effects are scores of zero, whereas Ceiling effects are scores of 100.

n=15	Mean + SD	Median	Range	Floor Effects	Ceiling Effects
Quality of Life Measure					
Pre-Injury	92.7+14.4	96	43-100	0	4
Initial	40.1+14.9	43	3-62	0	0
2 Week	71.3+12.9	71	46-88	0	0
4 Week	86.5+10.7	89	69-100	0	2
Clinical Rating Score					
Pre-Injury	---	---	---	---	---
Initial	41.5+9.7	40	26-63	0	0
2 Week	78.0+10.0	80	58-90	0	0
4 Week	90.1+6.5	91	79-98	0	0
SANE					
Pre-Injury	95.0+9.5	100	70-100	0	10
Initial	43.0+17.9	40	15-65	0	0
2 Week	74.5+16.5	80	50-95	0	0
4 Week	88.6+8.9	90	70-100	0	2

Measure scores would be significantly different). Non-parametric statistics were used for hypothesis testing because the majority of these data are from ordinal measurements. Kruskal-Wallis one-way analysis of variance on

ranks was utilized to test hypothesis one, whereas one-way repeated measures analysis of variance on ranks was used to test hypothesis two. Post hoc pairwise multiple comparison tests (Dunn's Method) were performed to delineate significant differences. The relationships between the Sports Ankle Rating System instruments were established for each evaluation interval using the Spearman ranks correlation statistic (r_s).

Responsiveness: The responsiveness of each instrument and its sub-components were determined by computing the change in score between evaluations (e.g. two-week evaluation Function score minus initial evaluation Function score). The effect size of the change in scores was calculated with the formula (effect size=mean difference score divided-by the mean standard deviation for the two evaluations).

Reliability Analyses

Valid assessment of test-retest reliability requires that the parameters being tested are stable between repeated measurements. A second critical requirement is that the interval between repeated measures is long enough

Table 2: Sports Ankle Rating System scores for the reference group. The mean scores are presented as mean \pm standard deviation (SD).

	Quality of Life Measure		Clinical Rating Score		SANE	
n=15	Mean \pm SD	Range	Mean \pm SD	Range	Mean \pm SD	Range
Initial Evaluation	99.4 \pm 1.1	96-100	97.1 \pm 2.9	92-100	99.5 \pm 1.4	95-100
Retest Evaluation	99.9 \pm 0.3	99-100	98.1 \pm 2.4	92-100	99.7 \pm 0.7	98-100

to prohibit subjects from remembering their prior responses on patient-based questionnaires (in general, at least one week should elapse between repeated measures). These test-retest reliability requirements presented us with a predicament because the functional status of patients with acute lateral ankle sprains changes rapidly. Pilot studies suggested that evaluating test-retest reliability in the ankle sprain group was unlikely to be valid. Our alternative was to assess test-retest reliability in the reference group. We recognized that this method was also less than ideal, but decided that it was the better of the two options because it allowed us to fulfill the requirements for valid reliability testing. Method error (ME) statistics were used to evaluate test-retest reliability because these statistics are recommended when the range of scores is particularly narrow, as was the case in the reference group (Table 2).²³ Systematic bias was tested for using paired t-tests.²³ The internal consistency of the QOL Measure and its sub-scales was assessed with the coefficient alpha statistic (Cronbach's alpha) using the ankle sprain group data.

RESULTS

Group and Interval Comparisons

Descriptive statistics for the four administrations of the Sports Ankle Rating System in the ankle sprain group are provided in Table 1. Descriptive statistics for the reference group are provided in Table 2. All of the ankle sprain group's post-injury QOL Measure, Clinical Rating Score, and SANE scores were significantly different from the respective reference group scores ($p < 0.001$); however, the ankle sprain group's "pre-injury" QOL Measure and SANE scores were not significantly different from the reference group's scores ($p > 0.05$). The ankle sprain group's scores on each of the Sports Ankle Rating System instruments were found to be significantly different across evaluation intervals ($p < 0.001$). Thus, both of our group and interval hypotheses were confirmed.

The QOL Measure and SANE correlated significantly ($p < 0.001$) and strongly ($r_s = 0.68-0.81$) across the four administrations of the questionnaires. The Clinical Rating Score correlated weakly with the QOL Measure and SANE at the initial evaluation, but correlated strongly with the QOL Measure ($p < 0.001$, $r_s = 0.72-0.87$) and moderately with the SANE ($p < 0.05$, $r_s = 0.62-0.68$) at the two and four-week evaluations. This confirmed our hypothesis. The correlation coefficients between the measures at each of the evaluation intervals are displayed in Table 3.

Responsiveness

Figure 1 demonstrates the change in scores for each of the three Sports Ankle Rating System instruments over the evaluation intervals. The Clinical Rating Score was the most responsive instrument at each of the intervals, but most noticeably in the first two weeks following injury. The responsiveness of each of the QOL Measure's five sub-scales is displayed graphically in Figure 2. Our hypothesis that each of the sub-scales would be most responsive at the two-week evaluation was confirmed (Fig. 2). The mean scores for each of the QOL Measure scales are plotted in Figure 3 (note the characteristic pattern) and described in Table 4. The combined VAS, Gait (in the first two weeks), Postural Stability, and Function were the most responsive Clinical Rating Score components. The effect sizes for each of the Clinical Rating Score components are presented in Figure 4.

Reliability Analyses

The reference group scores on each of the instruments were very high and varied little (Table 2). Each of the instruments, scales, and items had coefficients of variation (CV_{ME}) between test and retest scores that were $< 1\%$, with the exception of Postural Stability (the

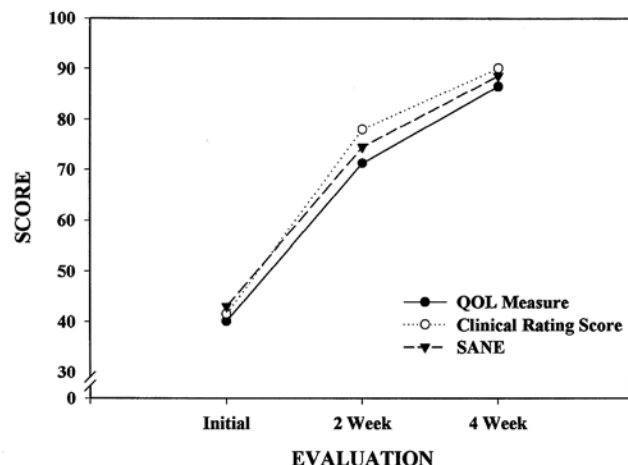


Fig. 1: Mean change in ankle sprain group scores on each of the Sports Ankle Rating System instruments across follow-up intervals. Abbreviations: QOL = Quality of Life, SANE = Single Assessment Numerical Evaluation.

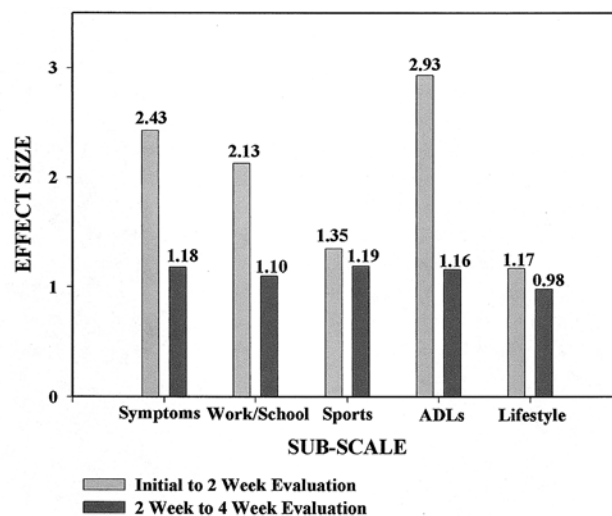


Fig. 2: Responsiveness of the Quality of Life Measure sub-scales by interval. ADLs = Activities of Daily Living.

single leg stance test), which had a CV_{ME} of 7.5%. There was no evidence of systematic bias ($p = 0.13$ to 0.336). The QOL Measure and each of its five sub-scales demonstrated excellent internal consistency at each interval with the coefficient alphas for the entire QOL Measure ranging from 0.87 to 0.89 and the coefficient alphas for the five sub-scales falling between 0.85 and 0.91.

DISCUSSION

Keller¹³ has recommended that outcomes research emphasize patient-based assessment rather than process-based assessment. Process-based assessments are traditional assessments made by clinicians

Table 3: Correlation Matrices for the three Sports Ankle Rating System instruments. Abbreviations: QOL Measure=Quality of Life Measure, CRS=Clinical Rating Score, SANE=Single Assessment Numerical Evaluation, (P)=Pre-injury score, (I)=Initial evaluation score, (2wk)=Two-week evaluation score, and (4wk)=Four-week evaluation score.

	QOL (P)	SANE (P)	QOL (I)	CRS (I)	SANE (I)	QOL (2wk)	CRS (2wk)	SANE (2wk)	QOL (4wk)	CRS (4wk)	SANE (4wk)
QOL (P)	1.00	0.73									
SANE (P)		1.00									
QOL (I)			1.00	0.31	0.68						
CRS (I)			0.31	1.00	0.37						
SANE (I)			0.68	0.37	1.00						
QOL (2wk)						1.00	0.87	0.81			
CRS (2wk)						0.87	1.00	0.68			
SANE (2wk)						0.81	0.68	1.00			
QOL (4wk)									1.00	0.72	0.80
CRS (4wk)									0.72	1.00	0.62
SANE (4wk)									0.80	0.62	1.00

Table 4: Ankle sprain group Quality of Life Measure scores at each interval. Data are presented as mean \pm standard deviation. ADLs=Activities of Daily Living.

n=15	Symptoms	Work / School	Sports	ADLs	Lifestyle
Pre-injury	17.8 \pm 3.2	19.4 \pm 1.8	17.8 \pm 4.8	19.5 \pm 1.8	18.2 \pm 3.1
Initial	5.9 \pm 3.3	9.1 \pm 3.0	6.2 \pm 3.8	9.6 \pm 3.7	9.3 \pm 4.1
2 Week	13.2 \pm 2.7	15.6 \pm 3.1	11.6 \pm 4.3	17.5 \pm 1.7	13.4 \pm 2.9
4 Week	16.5 \pm 2.9	18.3 \pm 1.8	16.1 \pm 3.3	19.3 \pm 1.4	16.3 \pm 3.0

(e.g. testing of strength, stability and range of motion), whereas patient-based assessment evaluates a patient's perception of his or her outcome.¹³ Quality of life is a concept encompassing a broad range of physical, psychological, and social characteristics that describe a person's ability to function and to derive satisfaction from doing so.^{2,8,26,27} An injury can have a profound effect on an athlete's quality of life, especially when it prevents the athlete from participating in sports or from performing at a level that he or she is satisfied with. Although quality of life assessment has been recommended, there are few outcomes measures in the orthopaedic literature that assess health-related quality of life.^{8,13,20} Each of the three Sports Ankle Rating System instruments is distinct from the others and can be used separately; however, when used together they provide a more complete assessment of a patient's ankle-related health status. The design and scope of the Sports Ankle Rating System are unique and set it apart from other ankle rating systems. We believe that this outcomes measurement system will enable clinicians that treat athletes to more completely assess their patients' outcomes following an ankle injury.

Each item, grading scale, and clinical test included in the Sports Ankle Rating System underwent pilot testing

with athletes who sustained ankle sprains and was decided upon by a panel of orthopaedic surgeons and physical therapists that treat a high volume of ankle injuries. In addition, we received consultation from several people with noteworthy

experience in outcomes measure development and/or expertise in treating foot and ankle injuries during the Sports Ankle Rating System's development and review process. Because these instruments were developed in a systematic manner that utilized standard item analysis, we have a high level of confidence in the validity of the Sports Ankle Rating System.

The Sports Ankle Rating System does not formally assess the presence of comorbidities because in our experience it is rare for athletes to have noteworthy comorbidities and most clinicians question their patients about comorbidities as a routine part of their assessments. Consequently, it was our opinion that the additional time requirement associated with a formal assessment of comorbidities would detract more from the measurement system than it would benefit it. If a patient has noteworthy comorbidities, then we recommend the addition of an instrument that assess the impact of them, such as the Musculoskeletal Function Assessment instrument when musculoskeletal comorbidities are present or the Medical Outcomes Study Short Form-36 (SF-36) when general health comorbidities are present.^{15-16,18,19,28}

The Motion, Postural Stability, and Function items of the Clinical Rating Score are evaluated by comparing

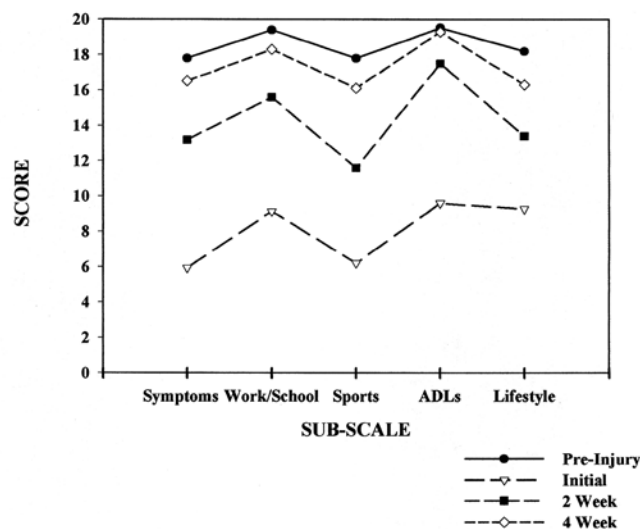


Fig. 3: Plot of the mean scores for each of the Quality of Life Measure sub-scales at each evaluation. ADLs = Activities of Daily Living.

the results from the involved extremity to those from the uninvolved extremity. Some athletes do not have a "pure" uninvolved comparison. Clinicians should decide whether or not this comparison is valid depending on the particular circumstances they are presented with. If ipsilateral pre-injury data are available (such as pre-season physical examination results), these data may serve as a more accurate comparisons than the contralateral values. Yet, it is our experience that even when the uninvolved leg is not perfectly "normal", it usually serves as a satisfactory comparison for the single leg stance and lateral hop tests.

Each instrument and item was found to be responsive to changes in ankle-related health status in our sample of subjects. As would be expected from the typical rate of healing for a grade II lateral ankle sprain, the greatest change in scores was observed in the first two weeks following injury. The Clinical Rating Score was determined to be the most responsive instrument at each interval, although the responsiveness of the instruments was similar during the second two-weeks of the study. The Symptoms and Work/School Activities scales were the most responsive of the QOL Measure sub-scales in the first two weeks following injury, whereas the Recreation and Sports sub-scale was determined to be the most responsive scale between two and four weeks post-injury. The Lifestyle scale was the least responsive sub-scale of the QOL Measure. This may be because the subjects recovered from their injuries rather quickly and consequently, the impact of these injuries on the items assessed in the Lifestyle scale was relatively minor. The lower responsiveness of the Lifestyle scale may also be related to the structured lifestyle of the cadets at USMA.

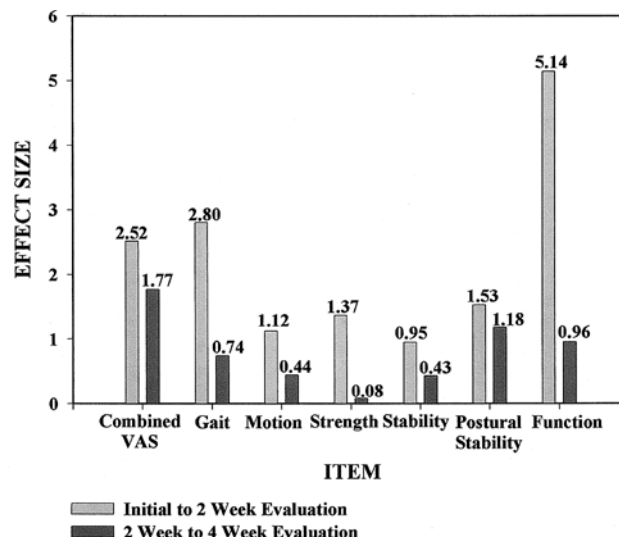


Fig. 4: Responsiveness of the Clinical Rating Score components by interval. VAS = Visual Analog Scales.

When the typical recovery of an athlete who has sustained a grade II lateral ankle sprain is considered, the responsiveness values for the QOL Measure sub-scales make clinical sense and provide further evidence that the Sports Ankle Rating system is valid.

The lack of consensus on a "gold standard" functional outcomes measure for ankle injuries at the time when this research was performed (1996) hampered our ability to assess criterion validity. Indeed, the lack of such a measure was an impetus for developing the Sports Ankle Rating System. Consequently, we decided to address criterion validity with a subsequent study when additional instruments became available. Although there is still no consensus on a "gold standard", several ankle-specific outcomes measures that may serve as good comparisons in analyzing criterion validity have been published since we initiated this project.^{1,24} Future research should compare each of the Sports Ankle Rating System instruments with other ankle-specific measures that are appropriate for use with athletes and also compare the QOL Measure and SANE with measures of general health status, such as the SF-36.^{17-19, 28}

Although it would have been preferable to assess test-retest reliability in the involved group, we determined that this was not feasible because the rate of healing following grade II ankle sprains is prohibitive to valid assessment of test-retest reliability. Performing this analysis in the reference group allowed us to fulfill the requirements for valid reliability testing. Very high response stability was expected and observed. These data indicate that the instruments behave appropriately in healthy athletes, but extrapolation to the injured population may not be possible. We acknowledge that this

is a weakness of the present study. Future research should evaluate the test-retest reliability of the Sports Ankle Rating System with athletes who sustain injuries that heal less rapidly, such as fractures or conditions requiring surgical intervention. The internal consistency of the QOL Measure and each of its sub-scales, however, was evaluated in the ankle sprain group and was determined to be excellent. This finding provides concrete support for the reliability of the QOL Measure.

This study represents the initial validation of the Sports Ankle Rating System. We chose to begin the validation process with athletes who had sustained ankle sprains because this is not only the most common injury that occurs in sports, but also the most common ankle injury overall.^{9-10,14} A recent study at West Point confirmed this fact by demonstrating that 23% of all musculoskeletal conditions that cadets sought treatment for were ankle sprains.¹¹ Furthermore, research indicates that at least one-third of the people who suffer an ankle sprain have persistent disability.^{3,11} These data necessitate an outcomes measurement system that effectively assesses the ankle-related health status of people who sustain ankle sprains.

CONCLUSIONS

We have introduced a new outcomes measure that is designed to evaluate the health status of athletes who sustain ankle injuries. The Sports Ankle Rating System consists of three distinct instruments:

1. the Quality of Life Measure (QOL),
2. the Clinical Rating Score, and
3. the Single Assessment Numeric Evaluation.

The Quality of Life Measure consists of five sub-scales that assess the impact that an ankle injury has on different aspects of an athlete's life that can affect his or her quality of life. The Clinical Rating Score utilizes patient-based visual analog scales and clinician-based testing to assess an athlete's ankle-related health status. The Single Assessment Numeric Evaluation is a single question assessment of a patient's perception of his or her ankle's functional status. The results of our initial validation study indicate that the Sports Ankle Rating System effectively measures deficiency following ankle sprains and is responsive to changes in health status that occur during the recovery process. The Sports Ankle Rating System has excellent content validity and has demonstrated excellent test-retest reliability in healthy athletes. The internal consistency of the QOL Measure was determined to be excellent. Additional research is required to validate the Sports Ankle Rating System across the range of ankle pathology and demographics that athletes present with. The flexibility of having three instruments that can be used separately or as

a more comprehensive whole, the integrated patient and process-based format, the assessment of quality of life, and specificity for athletes set the Sports Ankle Rating System apart from other ankle-specific outcomes measures.

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